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(54) LITHIUM ION BATTERIES WITH TITANIA/GRAPHENE ANODES

(75) Inventors: Jun Liu, Richland, WA (US); Daiwon
Choi, Richland, WA (US); Zhenguo
Yang, Richland, WA (US); Donghai
Wang, State College, PA (US); Gordon

L Graff, West Richland, WA (US); Zimin Nie, Richland, WA (US); Vilayanur V Viswanathan, Richland, WA (US); Jason Zhang, Richland, WA (US); Wu Xu, Richland, WA (US); Jin Yong Kim, Richland, WA (US)

(73) Assignee: **Battelle Memorial Institute**, Richland, WA (US)

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(58) Field of Classification Search

See application file for complete search history.

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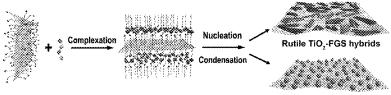
Primary Examiner — Patrick Ryan Assistant Examiner — Aaron Greso

(74) Attorney, Agent, or Firm — Klarquist Sparkman, LLP

(57) ABSTRACT

Lithium ion batteries having an anode comprising at least one graphene layer in electrical communication with titania to form a nanocomposite material, a cathode comprising a lithium olivine structure, and an electrolyte. The graphene layer has a carbon to oxygen ratio of between 15 to 1 and 500 to 1 and a surface area of between 400 and 2630 m²/g. The nanocomposite material has a specific capacity at least twice that of a titania material without graphene material at a charge/discharge rate greater than about 10 C. The olivine structure of the cathode of the lithium ion battery of the present invention is LiMPO₄ where M is selected from the group consisting of Fe, Mn, Co, Ni and combinations thereof.

8 Claims, 15 Drawing Sheets



Anatase TiO,-FGS hybrids